ABSTRACT OF THE DISCLOSURE

A π-conjugated organic material for detecting ionizing radiation, and particularly for detecting low energy fission neutrons. The π-conjugated materials comprise a class of organic materials whose members are intrinsic semiconducting materials. Included in this class are π-conjugated polymers, polyaromatic hydrocarbon molecules, and quinolates. Because of their high resistivities ($\geq 10^9$ ohm · cm), these π-conjugated organic materials exhibit very low leakage currents. A device for detecting and measuring ionizing radiation can be made by applying an electric field to a layer of the π-conjugated polymer material to measure electron/hole pair formation. A layer of the π-conjugated polymer material can be made by conventional polymer fabrication methods and can be cast into sheets capable of covering large areas. These sheets of polymer radiation detector material can be deposited between flexible electrodes and rolled up to forma radiation detector occupying a small volume but having a large surface area. The semiconducting polymer material can be easily fabricated in layers about 10μm to 100μm thick. These thin polymer layers and their associated electrodes can be stacked to form unique multi-layer detector arrangements that occupy small volume.